3rd Annual *Indoor Air Quality Tools for Schools* National Symposium

August 8, 2002

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Session Objectives

- Provide a brief overview of new Design Tools for Schools guidance now in development
- Describe new software to help schools make key ventilation and moisture control design decisions
- Make the connection between indoor air quality and High Performance Schools of the future

IAQ Design Tools for Schools

- New voluntary web-based guidance for design, construction, renovation, and operations and maintenance of school facilities
- Complements IAQ Tools for Schools guidance for existing schools

- Based on expertise from many sources:
  - State & local initiatives (e.g., CHPS, WA State, NYC Guidelines, SBIC, etc.)
  - In-house expertise

Why Design Guidance?

- 55 million people (53 million children) spend their days in the nation's 110,000 K-12 schools
- 6000 new schools will need to be built in the US by 2007
- Design decisions directly impact student and staff exposure to contaminants
  - Heating, ventilating, and air conditioning systems introduce, filter and distribute outside air and pollutants and play an important role in moisture control
  - Many contaminant sources can be both introduced as well as controlled through design decisions
- Construction practices play a critical role in moisture control

Why Design Guidance? (cont.)

- Failure to control moisture and outdoor and indoor pollutant sources can lead to:
  - Exposure of children and staff to mold and other allergens, particles, volatile organic compounds (chemicals), pesticides, and gases (e.g., radon, CO)
  - Respiratory illnesses including asthma (biggest cause of absenteeism due to chronic illness w>10 million missed school days per year), allergic reactions, and a variety of other illnesses and symptoms
- Failure to provide adequate ventilation reduces concentration and learning

Why Design Guidance? (cont.)

- Repercussions of poor design, construction and renovation practices may also include:
  - Loss of critical funding tied to attendance
  - Possible school closings -- both temporary and permanent (e.g., Belmont School, LA)
  - Potential liability

Components of IAQ Design Tools for Schools

- Introduction
- Design Overview
- Pre-Design
- Schematic Design
- Heating, Ventilation,and Air-Conditioning (HVAC)
- Controlling Pollutants and Sources
- Moisture Control
- Construction
- Commissioning
- Operations and Maintenance
- Renovation and Repair
- Portable Classrooms

- Hot Topics: Mold, moisture, siting, portable classrooms, material selection
- Site Map
- Links
- Facilities and Learning
- High Performance Schools
- Tool Box: checklists, case studies, IBEAM, SAVES

Next Steps

- Formal public comment period closed July 19, 2002
- Comments now being integrated
- Final posted this fall
- Suggestions still welcome

http://www.epa.gov/iaq/schooldesign/start.html

School Advanced Ventilation Engineering Software (*SAVES*)

Greg Bruner
U.S. Environmental Protection Agency
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Buying and Operating School Ventilation Equipment Costs $$$

- High occupant densities of schools often result in relatively high outdoor air ventilation requirements
  - ASHRAE Standard 62-1999: 15 cfm/occupant in classrooms
  - Can create challenges for designers to minimize initial equipment costs and operating (energy) costs
  - Increased ventilation rates can also lead to indoor humidity problems in some locations

Ventilation is Important for IAQ

- Proper ventilation with outdoor air is a key action for good indoor air quality in schools
  - Failure to provide adequate ventilation reduces concentration and learning
- Existing, off-the-shelf technologies can be used in some cases to help mitigate the negative cost and moisture impacts of high ventilation rates in schools
  - Includes energy recovery ventilation systems

School Advanced Ventilation Engineering Software *(SAVES)*

- **Indoor Humidity Assessment Tool**
  - Simple tool to evaluate the impacts of various design strategies on indoor humidity levels in schools (including energy recovery ventilation)
- **ERV Financial Assessment Software Tool**
  - Simple tool to assess the financial viability of energy recovery ventilation systems for school applications (simple payback and life cycle cost savings)
- Intended audience includes school designers (engineers and architects) and school procurement decision-makers

Edit View Go Communicator Help

SAVES Map

Zone 1 : Total-Recovery or Sensible-Only-Recovery ERV Systems Recommended
- -Total-Recovery Payback Typically 0 to 2 Years
- -Sensible-Only-Recovery Payback Typically 2 to 7 years

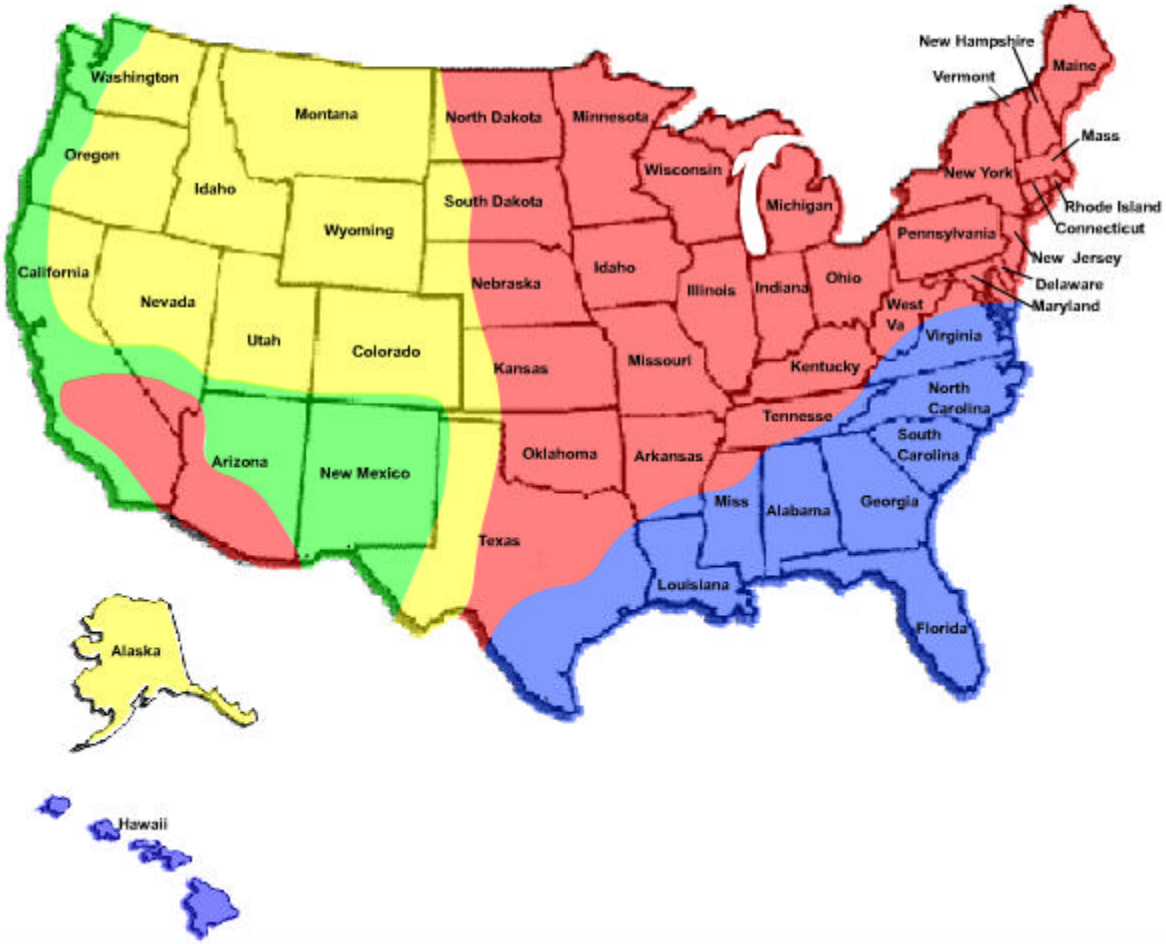
Zone 2 : Total-Recovery ERV Systems Recommended
- -Total Recovery Payback Typically **Immediate**

Zone 3 : Total-Recovery or Sensible-Only-Recovery ERV Systems Recommended
- - Payback for Both Configuratiuons Typically 2 to 7 years

Zone 4 : Conventional Ventilation Recommended, ERV Payback Typically Exceeds 7 Years

NOTE: MAP BASED ON SEVERAL ASSUMPTIONS

Please click on your state below to find out which zone your city resides in.



How Can I Get *SAVES* ?

- ***SAVES* Website:**
  www.epa.gov/iaq/schooldesign/saves.html
  - Both software tools are available for download
  - Supporting background information, instructions and guidance for using the software are also provided
- **CD-ROM and Marketing Brochure:**
  - Under development and coming soon (est. late summer 2002)